Welcome to
ECO 138: Economic Reasoning Using Statistics

with

Dr Karie Barbour

on Mondays and Wednesdays at 12:00

Myths About Statistics

- "If I had one hour left to live, I would choose to live it in statistics class because it would seem to last forever" - Student's Lament
- "There are three kinds of lies - lies, damned lies, and statistics." - Benjamin Disraeli
- "If it moves, it's biology; if it changes color, it's chemistry; if it breaks, it's physics: if it puts you to sleep it's statistics." - Bob Hogg, University of Iowa.

Printed in Elementary Statistics by Marilyn K. Pelosi and Theresa M. Sandifer

Course Objectives

- Course topics include descriptive statistics, basic probability theory and inferential statistics
- At the end of the course you should be able to:
  - Understand and apply appropriate statistical techniques to address a variety of questions
  - Analyze data using statistical software
  - Correctly interpret and effectively communicate your findings

Three Important Steps for doing Statistics

- Think - know where you are headed and why
- Show - calculate statistics and make displays
- Tell - explain your result so that someone else can understand your conclusions

Our Tools

- Intro Stats, 2nd Edition, by Richard D. DeVeaux, Paul F. Velleman and David E. Bock, Pearson Education, Inc.
- Statistical software package - SPSS
- Active Stats CD tutorial that accompanies the textbook

Grading Policy

- Exams (100 points each) . . . .300 points
  - Three regular semester exams – consisting of multiple choice and short answer questions.
  - No Make-up exams!!!
  - Optional cumulative final
- Quizzes (20 points each) . . . . 100 points
  - Lowest score out of six is dropped
  - No Make-up quizzes!!!

Grading Policy (con't)

- Data analysis assignments (3@20 points each)
  - Include SPSS results and in-depth analysis
  - Late assignments will be assigned a penalty of two points per day.
- Grading Scale
  - A - 460 to 414 pts
  - B - 413 to 368 pts
  - C - 367 to 322 pts
  - D - 321 to 276 pts

Tips for Success!

- Attend EVERY class
- Keep up with the readings
- Ask questions sooner rather than later
- Practice, Practice, Practice
- Use the ActiveStats Tutorials
- Free TUTORING at the University Center for Learning Assistance (UCLA)! www.ucla.ilstu.edu or 438-7100

Course Web Site

- http://lilt.ilstu.edu/kbarbou/eco138.htm
- Web Site contains:
  - Tentative course schedule (including quiz and exam dates)
  - Announcements
  - Lecture slides
  - Current grade report
  - Homework solutions
  - Data analysis assignments
  - STV computer lab hours

Objectives of Today's Lecture

- Class Survey
- Identify the Who, What, When, Where, Why and How of data
- Classify a variable as categorical or quantitative

Definition of Statistics

- Statistics is a collection of methods for planning experiments, obtaining data, and then organizing, summarizing, presenting, analyzing, interpreting, and drawing conclusions based on the data.

What do we mean by "data"?

- Data are observations (such as measurements or survey responses) that have been collected
- Methods for obtaining data
  - Published source, designed experiments, surveys, or observational study
- Data are useless without their context
  - To provide context we need to define the five W's (Who, What, When, Where and Why)

The "W's"

- Who - tells us the individual cases for which (or whom) we have collected data
- What - characteristics recorded about each individual or observation (a.k.a variables)
  - Two different types of variables
    - Quantitative variable
    - Categorical variable (a.k.a qualitative variable)

Quantitative Data

- Answer questions about the quantity of what is being measured
  - Measurements that are recorded on a naturally occurring numerical scale
  - Include units that tell how each value has been measured
  - Examples: income ($), temperature (kelvin scale), unemployment rate (%), test scores

Categorical Data

- Variable that names categories and answers questions about how observations fall into those categories
  - cannot be measured on a natural numerical scale, can only be classified into one of a group of categories
  - Examples: gender, race, political party affiliation, and a student's class

Why

- Which question(s) are we trying to address by analyzing the data
- Answering why may help you determine whether the variable is quantitative or categorical
- The why will determine how we think about a variable and how we treat it

Where, When and How

- When and Where give us some nice information about the context
  - Characteristics of the U.S. population in 1900 likely differ from those of today.
  - Characteristics of the population may differ from region to region
- How the data are collected can make the difference between insight and nonsense
  - Voluntary response surveys are often useless (More to come in Chapter 12)

Example:

- According to an article in *Fortune* (Dec. 28, 1992), 401(k) plans permit employees to shift part of their before-tax salaries into investments such as mutual funds. Employers typically match 50% of the employees' contribution up to about 6% of salary. One company, concerned with what it believed was a low employee participation rate in its 401(k) plan, sampled 30 other companies with similar plans and asked for their 401(k) participation rates.
- Identify the W's, name the variables and determine whether they are quantitative or categorical

Solution:

- Who - 30 similar companies, each company is an observation in the data
- What - 401(k) participation rates
- When - sometime after 1992
- Where - United States
- Why - the company in question is concerned that its employee participation rates is lower than the rates for similar companies
- How - unspecified sampling method
- Variables - 401(k) participation rate
  - Quantitative variable, units are percentages

Assignment

- Open the class survey Excel data file and look for any interesting facts.
  - What can you say, if anything, about your classmates?
- Get to know your textbook.
  - Read Chapters 1 & 2
- Try a few exercises from Chapter 2.
  - #3,7,11,and 25